

DRINKING WATER QUALITY *Annual Report* 2004



Message from the Mayor

Dear Neighbors,

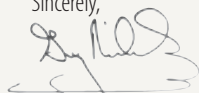
Seattle is fortunate to have clean, pure drinking water. Our region has abundant and pristine watersheds which we work hard to protect and enhance. The watersheds and our treatment facilities ensure that our water is always good to drink.

Because of new treatment technologies, the city's water quality has consistently improved over the last several years. With the completion of the Cedar Water Treatment Facility, we are providing a much higher level of public health protection and actually improving the taste of the water!

In this year's Drinking Water Quality Report, Seattle Public Utilities provides critical information about the quality of your water. You can also learn about how the watersheds provide salmon habitat and how the decisions of Seattle's pioneers benefit us today.

I encourage you to read this report and learn more about Seattle's drinking water. Or, you can get more information at the Washington State Department of Health website at www.doh.wa.gov/ehp/dw, visit the United States Environmental Protection Agency website at www.epa.gov/safewater, or visit the Seattle Public Utilities drinking water website at www.seattle.gov/util.

Sincerely,



GREG NICKELS
Mayor of Seattle

Inside this year's Drinking Water Quality Report

- Answers to common questions
- The interesting history of Seattle's drinking water
- Much to see in the Cedar River Watershed Education Center



Seattle's Water – A True Success Story

You turn the faucet on and water comes out. That may be all you know about Seattle's drinking water. But how that water comes to our faucets is an amazing story of our city founders' foresight, good planning through the years, and the best science around today.

The numbers alone are impressive. Our water system provides an average of 140 million gallons per day (MGD) for the region. Seattle's Regional Water System serves more than 1.3 million people, including customers in the City of Seattle and 21 other cities and water districts in King County. These wholesale water providers have their own storage and distribution systems.

It is only because the city founders began the purchase of the Cedar River Watershed long ago that we come by our water as easily as we do. Two watershed sources provide the majority of water for the system. About 70% is provided by the Cedar River, and the remaining 30% comes from the South Fork Tolt River (29%) and wells at the Seattle Wells (1%).

This report will answer some of the questions that are often asked about our water. The report will provide information about Seattle Public Utilities' "crown jewel", the Cedar River Watershed and its Education Center. It will also provide facts and statistics about our water, and focus on some interesting challenges in water quality today. And yes, you'll learn how that drop of water gets from the watershed to your faucet.

Seattle's water supply is truly a success story worth telling. In this report, we are glad to share with you the facts behind that story.



Photo by Eric Stuhang

Answers to Common Questions

These are some of the water quality questions from the public frequently heard at Seattle Public Utilities. Do you have another? If you do, call us at 206-615-0827.

Does Seattle fluoridate its water?

Yes. Fluoridation of Seattle's water supplies began in 1970, as a result of the passage of a public referendum in 1968. Fluoridation improves dental health and reduces cavities. The result of fluoridating Seattle's water, based on surveys conducted by the Seattle-King County Health Department and the University of Washington School of Dentistry, has been a 49% reduction

in dental decay. Seattle's water sources continue to be fluoridated at the recommended dose of 1 ppm, as a result of public support for fluoridation.

How is SPU protecting our water supplies?

After 9/11, the Federal Bureau of Investigation (the FBI) issued precautionary warnings to utilities nationwide. Seattle had already stepped up security at the time we received notice of the precautionary warning. The utility's reservoirs and other parts of the water system are under regular surveillance as part of a comprehensive security plan. The City of Seattle employs extensive security measures and has a state-approved plan to cover our open water reservoirs. Reservoir covering projects are already in the design or construction phase.

Does Seattle's drinking water meet regulations?

Our drinking water easily met all state and federal drinking water regulations in 2004. The many improvements made over the past several years have helped us provide such high quality water. In 2004, two compliance agreements between the Washington State Department of Health and Seattle were satisfied. One agreement related to our reduction of lead levels at residential homes, and the other related to treatment improvements on the Cedar supply. The only remaining agreement we have with the state is to finish covering our open distribution reservoirs by 2018.

We monitor the water quality continuously at the treatment plants,

and check several locations daily for a variety of parameters. In all, we analyze more than 20,000 samples every year to help assure the water meets all the standards.

Is mountain snowpack critical to our water supply?

While snowpack is important for river and stream flow in the region, rainfall also has a big role in our system. SPU regularly reviews conditions and has a number of tools to help manage the effects of abnormally dry conditions on people and fish. Many of these tools rely on the public's efforts to use water wisely. During dry conditions, the utility's actions are also guided by a comprehensive Water Shortage Contingency Plan. Seattle works closely with water users, public health officials, fisheries resource managers and others when implementing this plan. For more information on Seattle's water supply situation, visit http://www.seattle.gov/util/About_SPU/Water_System/Water_Supply/.

How Did We Get Our Water?

Picture this.

The year is 1889. The “Great Seattle Fire” has destroyed most of downtown Seattle. And city leaders recognized something, as they slowly rebuilt the city.

There hadn’t been enough water to fight the fire.

That event is a turning point in Seattle’s history. Many cities nationwide must buy their water from somewhere else — but not Seattle.

From 1854 until 1890, Seattle’s water was provided by wells, springs and private water companies. In 1888, prompted by a tenfold population increase during the previous decade, Seattle’s mayor and city council called for an election to decide if the city should own and operate its own water system.

Shortly before the election, the Great Seattle Fire destroyed the entire 64-acre business district. A major contributor to the widespread destruction was the lack of water available from the patchwork of private water suppliers. So the citizens approved a bond to purchase two private water

companies—the Spring Hill Water Company and the Union Water Company — both pumped water from Lake Union and Lake Washington. In 1895, Seattle residents again voted to approve revenue bonds, this time to construct the Cedar River water system.

Water first flowed from the Cedar River into Seattle’s system on January 10, 1901, and in 1909, a second pipeline was added. The next water supply source was not added until 1964, when the South Fork of the Tolt River began supplying north Seattle and the Eastside. In 1987, the first ground water source was added to the system when two wells near Riverton Heights began operation. A third well was added in 1990. But the Cedar River water system still provides the lion’s share of the city’s water supply.

Today, melting snow and rain are gathered and stored in two reservoirs — Chester Morse Lake and the Masonry Pool, created by the Masonry Dam. Built in 1914, the dam releases the water into two large 78 inch penstocks. The penstocks drop water 620 feet to the hydroelectric power plant at Cedar Falls. The water is released back into the river, and continues to flow for 12 more miles. When it reaches the Landsburg Dam, it is screened and chlorinated before being sent to Lake Youngs.

Predicting the water supply is as difficult as predicting the weather. Managing the water supply is a delicate balancing act. If not enough water is released in the winter, there could be flooding. If too much is released, there won’t be enough stored for the dry summer months. Water levels have to be kept low in fall and winter for flood control, yet drought conditions in the spring could prevent the reservoir from filling adequately.

But consider Seattle’s challenge in contrast to cities around the world — where good water is so rare. Seattle is indeed fortunate. A great fire and some forward-thinking city planners made all the difference.

That’s our history. Our future. Our water.



Seattle Municipal Archives

Masonry Dam (workers standing by concrete form)
April 18, 1914



How We Protect Your Watersheds

Clearly it is incredibly important that we keep our watersheds healthy — both for the salmon and other species that live there, and for our own safety. Since both watersheds are publicly owned, Seattle Public Utilities is able to vigorously protect its watersheds. The program prevents agricultural, recreational, and industrial activities from happening in the watersheds, and no one is allowed to live there.



The Washington State Department of Health has surveyed the Cedar and Tolt watersheds and determined that Seattle’s sources have a low vulnerability to contamination. This means there is little opportunity for contaminants to enter the water. Even so, there is always some potential for natural sources of contamination. In Seattle’s surface water supplies, the potential sources of contamination include:

- microbial contaminants, such as viruses, bacteria, and protozoa from wildlife;
- inorganic contaminants, such as salts and metals, which are naturally occurring; and
- organic contaminants, which result from chlorine combining with the naturally occurring organic matter.

The ABCs of Treating Your Water

Once you know where the water comes from, this could be the next logical question. How and where is the city's water treated?

Seattle's water supply is treated at the Cedar Water Treatment Facility (completed last year) and at the Tolt Water Treatment Facility (completed in 2001).

At the Cedar facility, the water is screened for debris (twigs, leaves), disinfected with chlorine,

fluoridated, and controlled for corrosion by adding a small amount of lime. In 2004, Seattle Public Utilities added two more steps in water treatment at the facility: ozonation and ultraviolet light (UV) disinfection.

The disinfection is very effective at killing *Giardia* and *Cryptosporidium*, as well as bacteria. The ozone process greatly improves the musty taste that sometimes occurs in the city's water supply. These two new processes, along with continued

protection of the Cedar River Watershed, monitoring and surveillance, and controlled river diversion, are all part of what Seattle Public Utilities does to ensure the safety and quality of the city's Cedar water supply.

The Tolt water supply has ozonation, filtration, fluoridation, pH and alkalinity adjustment and chlorination.



Sensitive Subpopulations and Our Water

Cryptosporidium is a disease-causing organism that is commonly found in the natural environment. In 2004, Cryptosporidium was detected in one of 33 raw water samples collected from the Cedar supply, with a maximum concentration of 2 organisms per 100 liters. These levels are very low compared with most rivers. With the construction of the new Cedar Water Treatment Facility in 2004 and the Tolt Treatment Facility in 2001, our treatment processes are now very effective at killing and removing Cryptosporidium.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as people with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS, or other immune system disorders, some elderly, and infants, can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. Environmental Protection Agency/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).



A Word from the Environmental Protection Agency

To ensure that tap water is safe to drink, the EPA adopts regulations setting the water quality standards for public water systems. The federal Food and Drug Administration regulates contaminants in bottled water and is responsible for providing the same level of public health protection.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA Safe Drinking Water Hotline (1-800-426-4791).

What's in Our Drinking Water?

The results of monitoring last year are shown in the table below. These results are for parameters regulated by federal and state agencies. For other water quality information, please check our web site (listed on the back) or call 206-615-0827. We can also send you a list of the 177 compounds for which we tested but did not find in our surface water supplies, including unregulated contaminants.



Water quality monitoring data can be difficult to interpret. To make all the information fit in one table, we used many acronyms that are defined below the table. In Seattle, if you live south of Green Lake, your water probably comes from the Cedar. Areas north of Green Lake usually receive Tolt water. Each source can provide water to other areas in Seattle if needed.

		EPA'S ALLOWABLE LIMITS		LEVELS IN CEDAR WATER		LEVELS IN TOLT WATER		
Detected Compounds	Units	MCLG	MCL	Average	Range	Average	Range	Typical Sources
Turbidity	NTU	NA	TT	0.8	0.2 to 4.25	0.06	0.03 to 0.66	Soil runoff
Total Organic Carbon	ppm	NA	TT	0.7	0.3 to 1.0	1.5	1.4 to 1.6	Naturally present in the environment
Fluoride	ppm	4	4	1.0	0.9 to 1.03	1.0	0.8 to 1.1	Water additive, which promotes strong teeth
Bromate	ppb	0	10	ND	ND	ND	ND to 1	By-product of drinking water ozonation
Total Trihalomethanes	ppb	NA	80	34	22 to 49	48	25 to 65	By-products of drinking water chlorination
Haloacetic Acids (5)	ppb	NA	60	25	12 to 42	31	25 to 37	
Total Coliform	% positive samples	0	5%	Highest month = 4.2% Annual Average = 0.7%				Naturally present in the environment
Chlorine	ppm	MRDLG = 4	MRDL = 4	Average = 0.9 Range = 0 to 2.0				Water additive used to control microbes

Definitions

MCLG: *Maximum Contaminant Level Goal* - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL: *Maximum Contaminant Level* - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MRDL: *Maximum Residual Disinfectant Level* - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG: *Maximum Residual Disinfectant Level Goal* - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TT: *Treatment Technique* - A required process intended to reduce the level of a contaminant in drinking water.

NTU: *Nephelometric Turbidity Unit* - Turbidity is a measure of how clear the water looks. The turbidity MCL that applied to the Cedar supply in 2004 is 5 NTU, and for the Tolt it was 0.3 NTU at least 95% of the time.

NTU. 99.95% of the samples from the Tolt in 2004 were below 0.3 NTU.

NA: *Not Applicable*

ND: *Not Detected*

ppm: *1 part per million* = 1 mg/L = 1 milligram per liter

ppb: *1 part per billion* = 1 ug/L = 1 microgram per liter

1 ppm = 1000 ppb

Lead and Copper Results

Although there is no detectable lead in our source water, tests show there are sometimes elevated levels of lead and copper in some samples, primarily because of corrosion of household plumbing systems. These results show that it is very important that homeowners, business owners and others be aware of their type of plumbing, and how the plumbing affects their drinking water quality.

The majority of homes have some risk of lead contamination in water that sits in pipes for longer than two hours. Where you live, when your plumbing was installed and what type of plumbing you have, all play a part in determining your potential exposure level.

To have your home tested, contact a certified lab near your area. The Washington State Department of Ecology is responsible for certifying labs in Washington. The Department of Ecology web site lists labs certified to test drinking water. Analysis costs range from \$25 to \$50.

Finally, remember that drinking water is only a minor contributor to overall exposure to lead. Other sources, including paint, soil and food, also contribute.



Lead and copper regional monitoring program results

Parameter and Units	MCLG	Action Level+	Results of 2004 Sampling*	Homes Exceeding Action Level++	Source
Lead, ppb	0	15	10.3	24 of 375	Corrosion of household plumbing systems
Copper, ppm	1.3	1.3	0.26	0 of 375	

* 90th Percentile: i.e. 90 percent of the samples were less than the values shown.

+ The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

++ All of the homeowners who participated received the results of the monitoring.

Other Water Quality Data

Seattle Public Utilities monitors many other parameters in the water that are not regulated, but may be of interest to our customers. The following table includes many of these parameters, some of which have a Secondary Maximum Contaminant Level (SMCL). A SMCL is set based on aesthetics, and does not have a health impact.

Monitoring for these parameters occurs either at the entry to the distribution system, right after treatment, or within the distribution system. More water quality data can be found on our web site listed on the back of this report.

Secondary Standards	SMCL	Units	Cedar	Tolt
Aluminum	50 - 200	ppb	29	62
Iron	300	ppb	49	14
Manganese	50	ppb	5	ND
pH, range	6.5 - 8.5	pH units	7.8 - 8.7	7.9 - 8.3
Other Parameters				
Alkalinity, Total (as CaCO ₃)	NA	ppm	20	20
Hardness, (as CaCO ₃)	NA	ppm	29	30
Hardness, (as CaCO ₃)	NA	grains/gallon	1.7	1.7
Sodium	NA	ppm	2.8	1.1



Cedar River Watershed Education Center

The Cedar River Watershed Education Center is a regional facility created as a gathering place to connect people with the source of their water. Nestled above the shores of Rattlesnake Lake in the Cascade foothills, the Center is a gateway to the Cedar River Watershed.



The Center provides opportunities for thousands of visitors to learn about the complex issues surrounding the region's drinking water, forests and wildlife. It also makes accessible an extraordinary collection of more than 9,400 years of human activity in the watershed and offers facilities for conferences, workshops and retreats.

The \$6 million Education Center opened on October 2, 2001. Funding for the Center was provided through a partnership between the City of Seattle and the non-profit Friends of the Cedar River Watershed.

The Friends of the Cedar River Watershed is a private, non-profit organization incorporated in 1996 and dedicated to the protection and enhancement of the Cedar River Watershed. Visit the Friends of the Cedar River Watershed for more information. Their web site is www.cedarriver.org

For more general information about the Education Center call 206 233-1515.



Treatment Facility – Making Our Water Better Than Ever

One of the great success stories of our water system is the new Cedar Water Treatment Facility. Now in its first full year of operation, the facility is the largest of its kind in the nation. It provides safer, better tasting water to nearly a million people throughout King County.

The Cedar Water Treatment Facility is among the first in the world to utilize ultraviolet light (UV) disinfection to treat drinking water, ensuring that Seattle's customers receive the highest quality water.

The new Cedar Water Treatment Facility, owned by Seattle Public Utilities, disinfects water from the Cedar River, which supplies 70 percent of the drinking water to Seattle and surrounding suburban communities. The new facility ensures that Seattle's primary water supply meets or exceeds federal water quality standards. It can treat up to 180 million gallons per day.





Be involved

Seattle Public Utilities and the City of Seattle want your opinion, and we have several ways for you to give it. You can participate through public hearings associated with environmental permitting and reviewing new facilities. There are regular utility briefings at the City Council and other meetings, formal and informal, with the utility. Please check your newspaper, our website, and other community postings for listings.

Be informed

How you can get more information

Seattle Public Utilities

Customer Service Center: 206-684-3000
(billing, report leaks or dirty water, etc)

Water Quality Website: www.seattle.gov/util/services/Water/Water_Quality

Water Quality Email: drinkingwater.quality@seattle.gov

Water Quality Phone: 206-615-0827

Washington State Department of Health

Website: www.doh.wa.gov/ehp/dw/

U.S. Environmental Protection Agency

Website: www.epa.gov/safewater/

Safe Drinking Water Act Hotline: 1-800-426-4791

Safe Drinking Water Act Email: hotline-sdwa@epamail.epa.gov

or you can visit the American Water Works Association's new website: www.drinktap.org.



Photo by Hawk Jones



Seattle Municipal Archives

Be Active

Please help us and share this report with other people who drink water provided by Seattle Public Utilities, including those who may not have received the report directly (for example, some apartments, nursing homes, schools, and businesses). You can do this by posting the report in a public place, or distributing copies by hand or mail. You can also access this report through the Seattle Public Utilities website listed above.

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